DOCKET
12-BSTD-1
DATE APR 26 2012
RECD. APR 26 2012

April 26, 2012

Comments regarding the PROPOSED 2013 REVISIONS TO THE CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS and GREEN BUILDING STANDARDS CODE, TITLE 24, PARTS 1, 6 and 11, DOCKET NO. 12-BSTD-1, CEC-400-2012-002 (Process Boilers)

To the CALIFORNIA ENERGY COMMISSION:

Enovity administers the boiler efficiency program on behalf of PG&E, and has done so since 2006. With our expertise in the energy analysis of boiler systems, Enovity provides the following comments regarding the analysis for the proposed process boiler measures conducted in the CASE Report for Process Boilers, dated October 2011.

1) The analysis conducted for these measures is based on a PV averaged natural gas cost of $1.22 per therm. We recommend that this assumed gas cost be reviewed, as current natural gas costs for industrial customers and future projections (such as those from the DOE EIA) appear to contradict this assumption and point towards lower gas costs. This assumption will impact the cost/benefit results. With the current and projected low natural gas costs, we have concluded that certain boiler energy efficiency measures are not as cost-effective as they were in recent years.

2) The analysis for the combustion fan VFD measure does not take into account the realization that many burner control manufacturers require O2 trim control to be installed with a fan VFD (i.e., a packaged burner control system with parallel positioning controls, O2 trim and fan VFDs). The requirement to install O2 trim control increases the measure cost and also the combined effectiveness since O2 may not provide much incremental natural gas energy savings. (See the comments below regarding O2 trim control.) It is our experience that the packaged control upgrade for burner parallel position controls with O2 trim and a combustion fan VFD is typically cost effective for larger boilers with high annual runtime. The end result is that the 10 hp requirement may be too low of a cutoff and may result in a cost burden for many new process boiler installations.

3) While parallel positioning controls is a good measure for boiler energy efficiency, we are concerned that the calculated energy savings may be over estimated. Our primary concern is that the base case assumption of 6.5% to 10% excess O2 is unreasonably high, particular for new boilers with single point mechanical linkage control. In many cases, older boilers have been found to operate in this range of excess O2, but newly installed boilers will likely operate with a lower range of excess O2. Over time the linkage controls will likely not achieve the same excess O2 levels as originally installed. Additionally, in our experience we have found many existing

Enovity, Inc. 100 Montgomery Street, Suite 600, San Francisco, CA, 94104 (415)974-0390 (v) (415)974-0399 (f)

(older) boilers operating with excess O2 levels below the assumed range of 6.5% to 10%. It depends a on the type of burner, the NOx levels, the burner and boiler condition, if the boiler is located indoors or outdoors, and how the linkage controls were configured during tuning. From our measure workpaper for the PG&E Boiler Efficiency Program, we reported on an average savings of 0.26 therms per MBtuh for burner control upgrades (as a retrofit measure). Comparatively, the analysis is the CASE Report appears to have an average savings of 0.34 therms per MBtuh as an incremental analysis for newly installed process boilers. The analysis in the CASE Report is based on a weighted average reduction of 3.8% excess O2 (from 8.8% to 5%). From our experience (based on actual pre and post measurements), an average 3.8% reduction in the excess O2 is likely too high to assume across all boilers. It can be achieved for some existing boilers, but may not be appropriate as an average for all newly installed boilers.

4) The analysis for the O2 trim control measure does not account for the impact of boiler NOx regulations. Maintaining 3% O2 is not possible for most low or ultra NOx burners (or may require a more expensive external NOx treatment system in order to achieve this level of O2). Also, many ultra low NOx burners are equipped standard with O2 trim control in order to maintain their ultra low NOx levels.

5) The statewide energy savings for O2 trim does not indicate that savings were only applied to new boilers that are not low or ultra low NOx, as was the case with parallel positioning controls.

6) We recommend that O2 trim only be required for boilers located outdoors or in which the combustion air temperature/humidity tracks ambient air conditions (assuming it is indeed a cost effective measure to mandate for certain size boilers). For process boilers in which the combustion air temperature is relatively constant, O2 trim control will likely not provide as much incremental energy savings. This was demonstrated in the analysis of an actual installation that was analyzed by Enovity and PECI prior to the CASE Report. In cases where the combustion air conditions are relatively constant, parallel positioning controls can be configured to provide a lower excess air level than compared to boilers in which the combustion air conditions will vary from the actual conditions during the configuration and tuning. O2 trim control will compensate for changes in the combustion air temperature and humidity and is most advantageous in this application.

Thank you,

Eric Koeppel, P.E.
Technical Director, Enovity, Inc.

Enovity, Inc. 100 Montgomery Street, Suite 600, San Francisco, CA, 94104 (415)974-0390 (v) (415)974-0399 (f)